

Factoring Trinomials when $(A > 1)$

$$\frac{1}{a} \sqrt[3]{3x^2 + 20x + 12}$$

FIND FACTORS
OF A.C THAT
ADD TO B

$$\begin{array}{r} \text{a.c} \\ 3 \times 12 = 36 \\ \hline 1, 36 \\ \hline 37 \\ \hline 20 \leftarrow \end{array}$$

METHOD 1 - BOX METHOD

REWRITE EQUATION SPLITTING THE MIDDLE TERM.
USE THE FACTORS IDENTIFIED IN THE PREVIOUS STEP

$$3x^2 + 2x + 18x + 12$$

COPY THE TERMS TO A BOX

$3x^2$	$+2x$
$+18x$	$+12$

DETERMINING
THE FACTORS

	$3x + 2$	
\times	$3x^2$	$+2x$
$+6$	$+18x$	$+12$

WRITE ANSWER IN BINOMIAL FORM

$$(3x + 2)(x + 6)$$

METHOD 2 - FACTOR BY GROUPING

REWRITE EQUATION SPLITTING THE MIDDLE TERM (SEE METHOD 1)

$$3x^2 + 2x + 18x + 12$$

$$(3x^2 + 2x) + (18x + 12)$$

$$\times (3x + 2) + 6(3x + 2)$$

GROUP INTO SETS OF 2

PULL THE GCF OUT OF EACH
BINOMIAL. THE BINOMIALS LEFT
IN THE PARENTHESES SHOULD BE
THE SAME.

$$(3x + 2)(x + 6)$$

REWRITE AS THE PRODUCT OF
2 BINOMIALS

METHOD 3 - GCF SHORTCUT

$$3x^2 + 20x + 12$$

REWRITE, PUTTING AX IN EACH
BINOMIAL. USE FACTORS FOUND

$$\begin{array}{r|l} 3 \cdot 12 = 36 & 20 \\ \hline 1, 36 & 37 \\ \hline 2, 18 & 20 \end{array}$$

$$(3x + 2)(3x + 18)$$

no 3 yes

← DIVIDE (SORT OF) TRY A

$$(3x + 2)(x + 6)$$

ONLY DIVIDE THE TERM THAT HAS
THE VALUE OF A AS A COMMON FACTOR